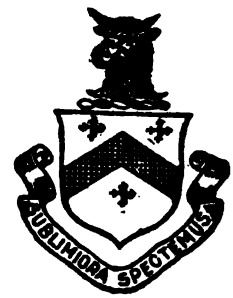
Index to Stereograms

PART II

X-Ray Examination of the Alimentary Tract

JAMES T. CASE, M. D., F. A. C. S.

PART II



SECTION XXXV
OF THE
STEREO-CLINIC
EDITED BY
DR. HOWARD A. KELLY
BALTIMORE, MD.

Index to Stereograms

PART I

Index to Stereograms

PART II

the chest showed no abnormality. A study of the urinary tract did not confirm a diagnosis of renal disease.

¶ At operation there was found an inflammatory mass the size of a hen's egg, surrounding an ulcer at least an inch and a half in diameter, on the greater curvature at a point corresponding to the filling defect shown in the stereoroentgenogram. Post-operative studies showed this mass to be a large tuberculous ulcer. Resection of the stomach was performed, followed by the usual gastroenterostomy, with excellent results.

Tuberculous Ulcer of the Stomach.

[Stereo 23.]

¶ The patient, female, aged thirty-three, came with a diagnosis of tuberculosis of the kidney, complaining of pain on the left side radiating toward the epigastrium. The pain did not seem characteristic of renal disease, however, and gastric symptoms were so marked that a bismuth meal examination was made, resulting in the discovery of a filling defect on the greater curvature, as shown in the accompanying stereoroentgenogram. A diagnosis was made of a tuberculous ulceration on the greater curvature, about two and a half inches in extent, producing a large filling defect similar to that seen in carcinoma of the stomach.

¶ Despite the fact that the patient's temperature was characteristic of a tuberculous lesion, there were no physical evidences of disease of the lung. Stereoroentgenograms of

Stereo 23. **Serial Nº 502**

formity of the duodenal bulb. Spastic indrawing seen high up on the greater curvature, even with the patient standing.

¶ At operation the scar of a chronic ulcer was palpated on the duodenal side of the pylorus, the scar tissue forming a mass the size of an English walnut. No enlarged lymphatic glands were found. A gastrojejunostomy was performed.

¶ Physical examination showed a moderate enlargement of the stomach. Visible gastric peristalsis.

¶ The roentgen examination showed the lower border of the stomach three inches below the navel, patient standing, stomach filled. Peristaltic waves unusually deep, proceeding to the pylorus unhindered. Emptying time of the stomach longer than twelve hours. The first part of the duodenum was not made out normally at any time. The contour of the entire duodenum could be distinctly made out, extending from the stomach to the under surface of the liver, then back toward the cardia and then behind the left border of the stomach. The appearance of the duodenum was very unusual. An opinion was given of pyloric ulcer with gastrectasis; distension of the first portion of the duodenum indicative of duodenal obstruction, probably associated with the pyloric ulcer.

¶ The accompanying stereoroentgenogram shows the residue in the stomach at the end of six hours. The lower border of the liver is easily made out, thanks to the gas accumulation in the right half of the colon. The black ring near the middle of the plate is the navel marker. The stereoroentgenogram was made with the plates anterior, plate standing. The unusual course of the bismuth-filled duodenum is easily made out.

¶ At operation, by Dr. Kellogg, there was found an ulcer on the posterior wall near the pylorus, associated with extensive adhesions of the duodenum, producing duodenal obstruction.

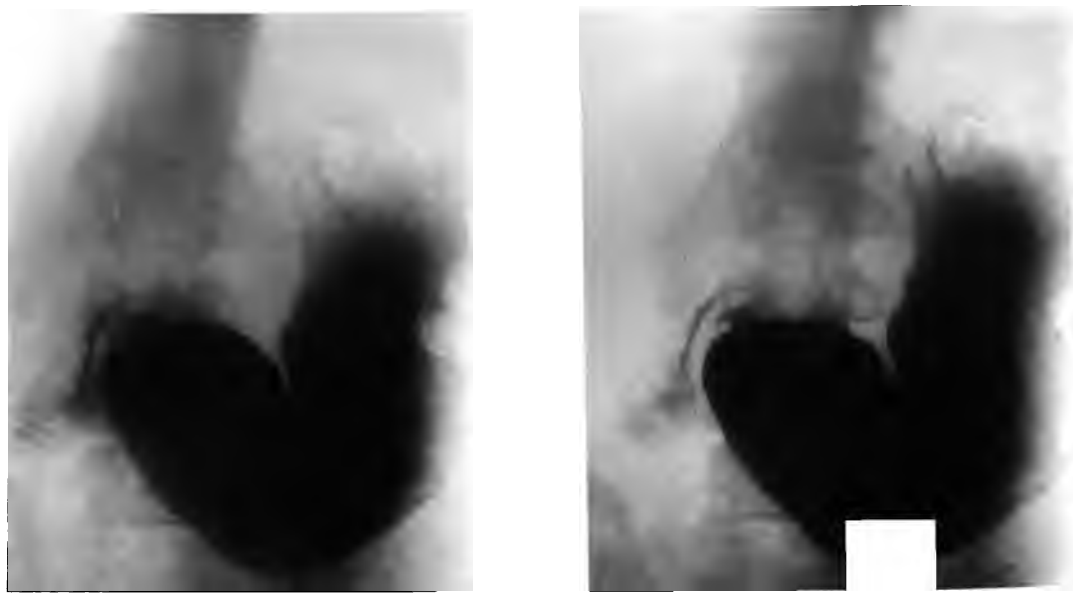
Duodenal Ulcer.

[Stereo 24.]

¶ Patient, male, age sixty-four, applied for treatment for extreme epigastric pain, occurring almost daily, radiating toward the back when most severe. Pain almost constant, but greater after eating. Unable to sleep at night because of pain. At first sodium bicarbonate gave relief. Pressure aggravates it. Vomiting has occurred almost daily during the last four weeks. Fifteen pounds loss in weight during the last month. No constipation. Marked gastric dilatation. Visible peristalsis. Only moderate tenderness on pressure.

¶ The roentgen examination showed marked hyperperistalsis, with very distinct antiperistaltic waves. At times the peristaltic waves were much exaggerated in depth; at other times they were scarcely perceptible. Emptying time of the stomach about twenty hours. Definite de-

Stereo 24. **Serial No. 502**



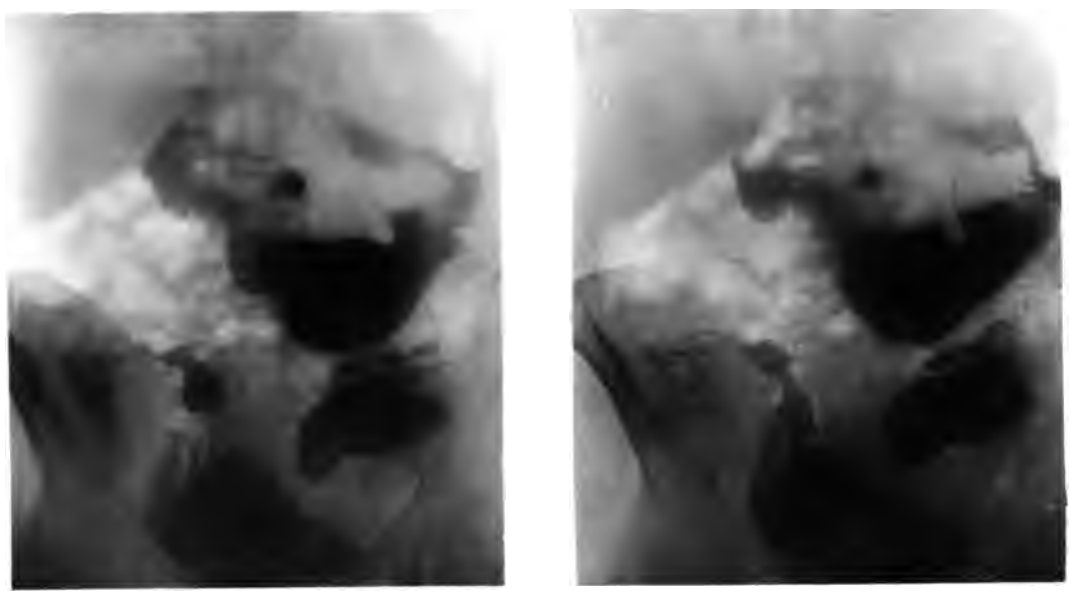
Ulcer of the Stomach.—Duodenal Obstruction.

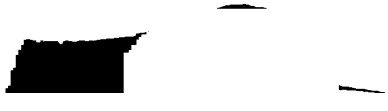
[Stereo 25.]

¶ Patient, male, age fifty-nine, attorney, for a decade suffered from painful digestion. Recently the pain ceased, but the patient was obliged to use a stomach tube once or twice daily. Sometimes he found food eaten two or three days previously. Often, in the morning, he found in the stomach food which he had eaten the previous day. Appetite good. The patient has been constipated for the past eighteen months.

¶ Still more recently there has been a return of frequent and severe pain, for which opium suppositories have been administered almost daily. The condition of the stomach has been such that work has been out of the question for some months. No blood was found at any gastric analysis, although several tests were made over a period of four years. The free hydrochloric acid showed only a slight increase.

Stereo 25. **Serial No. 502**





bismuth was seen to trickle from the upper into the lower sack, about twenty minutes being required for emptying the upper half of the hourglass stomach. The hourglass appearance in this case is partly spastic, partly organic. On the lesser curvature, opposite the spastic incutting, there is seen a small outcropping of the gastric shadow, due to the presence of bismuth in the crater of the ulcer. Pylorus normal. Peristaltic waves normal below the ulcer. Emptying time of the stomach normal.

¶ This is a typical ulcer of the type to which Haudek first drew attention. Haudek demonstrated that a flat ulcer of the stomach would not give any shadow, owing to the deposition of the bismuth on its surface; and hence any abnormal, circumscribed shadow seen after a bismuth meal is due to the incarceration of the bismuth in a pathological pocket or diverticulum. A penetrating ulcer of the stomach may frequently give rise to a special appearance—an outgrowth or diverticulum of the bismuth shadow, which often has an air bubble at its summit, providing the examin-

Fig. 19

ation is made with the patient erect. This is shown diagramatically in Figure 19, and is well illustrated in several of the stereos to be shown later.

¶ This diverticulum often retains bismuth for a considerable time. Haudek demonstrated that the ulcer pocket need have no great depth in order to retain a deposit of bismuth sufficient to show on the roentgen screen. He cites one case in particular in which a penetrating ulcer into the pancreas was diagnosed, where the excavation was only a few millimeters in depth.

Penetrating Ulcer of the Lesser Curvature.

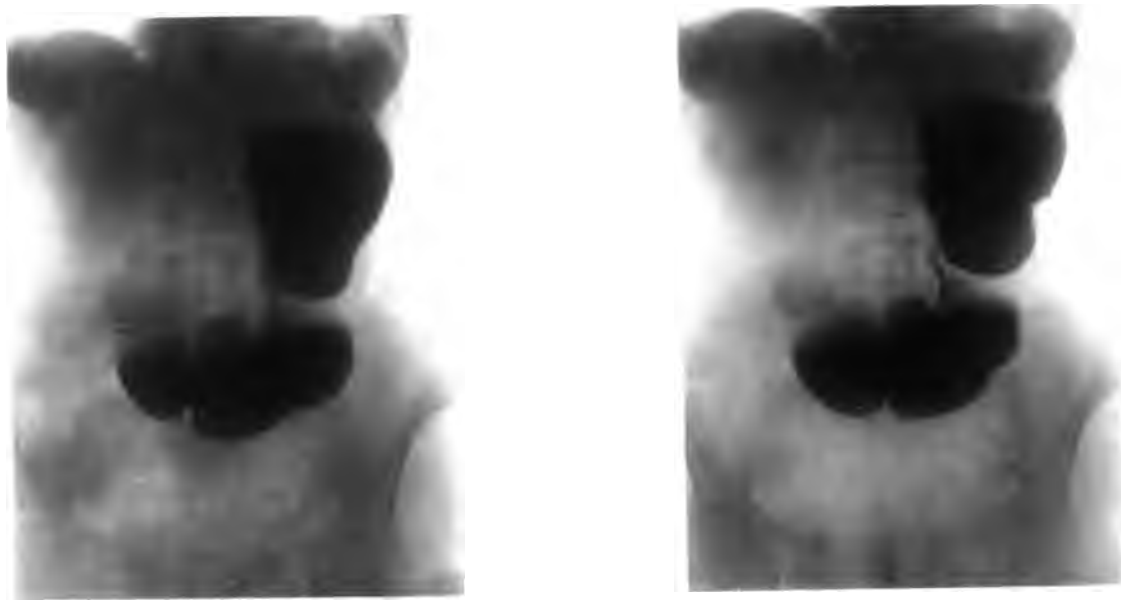
[Stereo 27.]

¶ This plate was kindly loaned by Dr. Fedor Haenisch, of Hamburg. The hourglass appearance in this case is again partly spastic and partly organic. Under anesthesia the spasm was almost entirely relaxed. The hourglass contraction is met with in only about half the cases, suggesting that although ulcer on the lesser curvature tends to the development of an hourglass contraction, the hourglass appearance is by no means necessarily found in all lesser curvature ulcers.

¶ At operation there was found an ulcer on the lesser curvature, anteriorly, penetrating into the liver. This was demonstrated roentgenologically by the fact that during respiration the shadow of the ulcer moved up and down. When a lesser curvature ulcer penetrates into the pancreas there is no respiratory movement of the ulcer shadow.

¶ In spite of the short exposures and the rapid change of plates, the stereoscopic effect in this case is blurred by the rapid progress of the peristaltic waves.

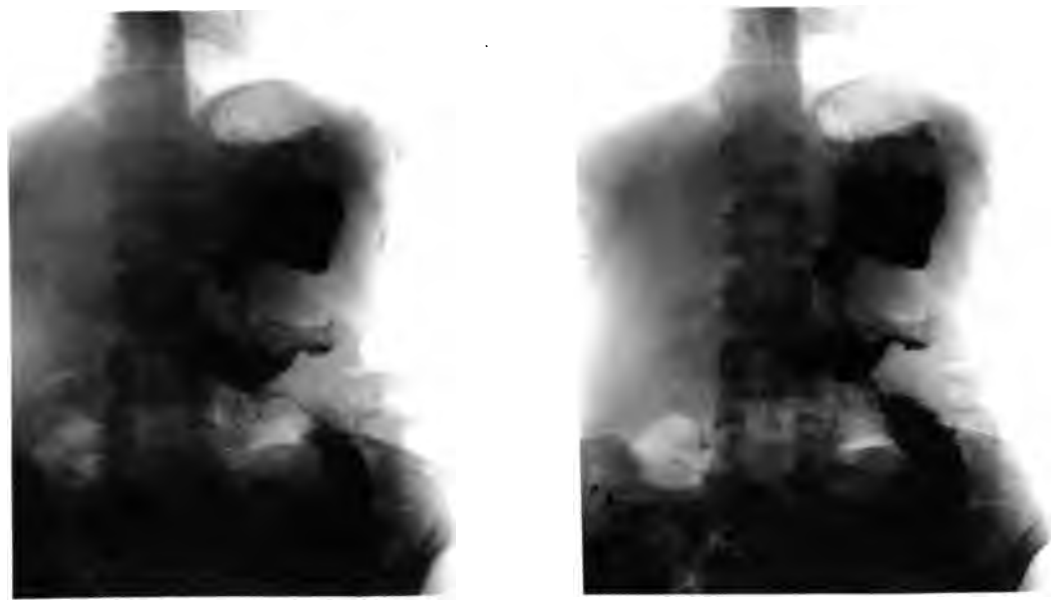
Stereo 27. **Serial No. 502**



Penetrating Ulcer of the Lesser Curvature.
[Stereo 28.]

¶ The crater of the ulcer can be seen filled with bismuth. Above it is a small air bubble. Note the failure of the coincidence of the outline of the two plates. This is due to the changes brought about by peristaltic waves, even during the second required for making the two plates. The patient had had a gastroenterostomy seven years previously for ulcer of the stomach. The gastroenterostomy opening is now seen to functionate perfectly, but, in spite of the operation, the ulcer went on to perforation and consequent gastric deformity.

Stereo 28. **Serial No. 502**



Penetrating Ulcer of the Lesser Curvature.
[Stereo 29.]

¶ The patient, a young woman, had suffered from digestive disturbance for a period of ten years. Later the symptoms were very much more acute and pointed clinically to a gastric ulcer. There was, however, no interference with the emptying time of the stomach and no symptom to indicate the exact location of the ulcer.

¶ The roentgen examination shows a typical hourglass stomach, associated with penetrating ulcer of the lesser curvature. The hourglass constriction is partly spastic and partly organic, as has been shown before. Stereoscopically, the connection between the two sacks is seen to be more nearly anterior than posterior. The stereoroentgenogram was made with the patient standing, plates anterior, hence at the top of the stomach, the magenblase, or air bubble, is seen above the level of the fluid contents. That the hour-

Stereo 29. **Serial Nº 502**

glass appearance is only partly organic was proven by the fact that, during the fluoroscopic examination, the isthmus connecting the upper and lower sacks was seen suddenly to relax, permitting a large quantity of the contents of the upper sack to pass into the lower sack within a very few minutes.

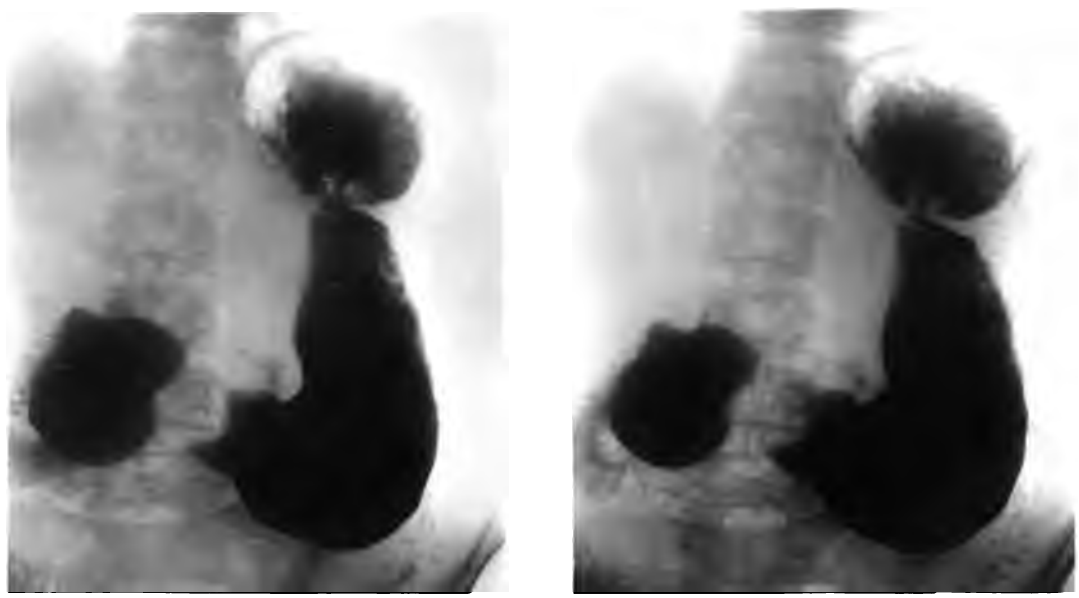
¶ The patient died from perforation of the ulcer. I am indebted to Dr. A. G. Sullivan for post mortem findings in this case.

Chronic Gastric Ulcer.

[Stereo 30.]

¶ Chronic gastric ulcer, situated high up on the lesser curvature, duodenal obstruction. Patient, female, age fifty-seven, gives a history of stomach symptoms covering twelve years. Vomits once or twice a day. Seldom passes two or three days without vomiting. Vomitus sour. Great deal of epigastric tenderness. No definite point of pain on pressure. The hourglass appearance is partly spastic, partly organic. There is a bismuth fleck high up on the lesser curvature, representing the crater of an ulcer. Peristaltic waves unusually deep. Pylorospasm. Duodenal dilatation marked for about three inches. Extensive adhesions about the duodenum about three inches from the pylorus. Bismuth-mixed food remained in the upper sack only fifteen or twenty minutes.

Stereo 30. **Serial No. 502**



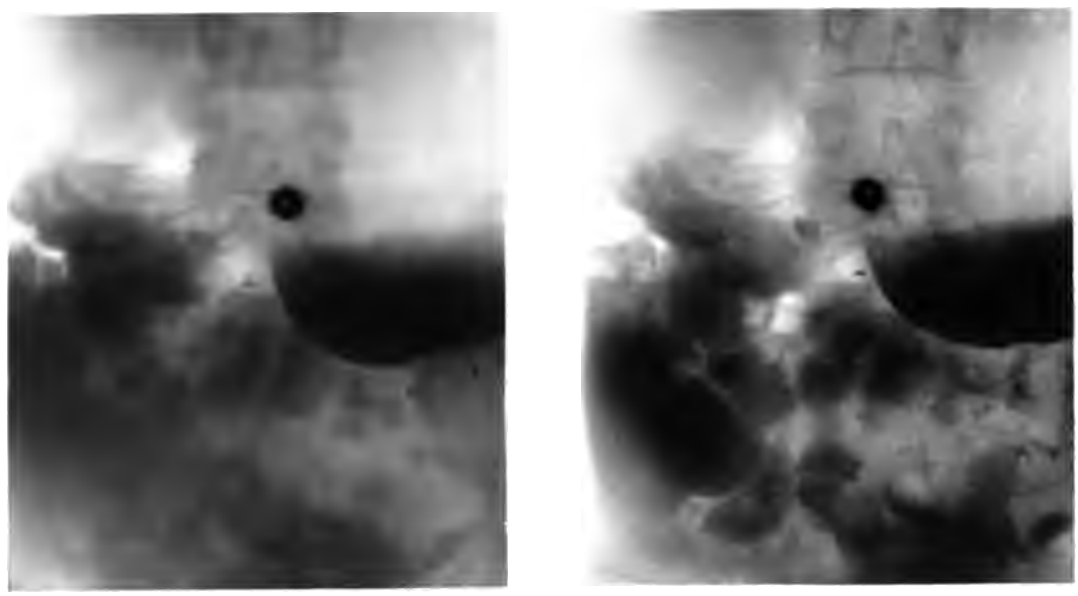
Duodenal Ulcer.

[Stereo 31.]

¶ The patient, male, age forty-four, a lawyer, gave a history of gastric disturbance, dating back about ten years. The patient suffered from periodical attacks of pain every two or three days, each attack being followed by gradual subsidence of the symptoms. During the last few months the pain has radiated to the back. Most of the time a definitely localized point of pain on pressure has been present, just above and to the right of the navel. Twenty pounds loss of weight in one year. Gastric analysis gave no abnormal findings. The patient had occasional vomiting spells, but on two occasions when search was made there was no positive reaction for occult blood. At first the pain was relieved by eating, but lately the relief has been only transient.

¶ The roentgen examination showed vigorous peristaltic waves proceeding clear to the pylorus without hindrance.

Stereo 31. **Serial No. 502**



Pyloric closure normal. During the first half hour following the bismuth meal, the gastric contents passed readily through into the small intestine. Later very little was seen passing through, and at the end of six hours, there was still a very large residue in the stomach, as shown in the stereoroentgenogram reproduced herewith. There was a small bismuth fleck one-third of an inch in diameter at a point which was estimated to be within a half an inch of the pylorus, on the duodenal side. On account of the bismuth fleck it was believed that the ulcer was near penetration. The second, smaller fleck between the ulcer fleck and the stomach shadow, is believed to be bismuth in the ampulla of Vater. The delay in the emptying time of the stomach was considered due to the late pylorospasm, associated with duodenal ulcer.

¶ Two days later the abdomen was opened and a typical duodenal ulcer was found. There was a localized area of peritonitis extending for two or three inches around the ulcer. The surgeon expressed considerable anxiety during the operation, fearing manipulation would bring about a rupture of the duodenum at this point. The ulcer was found exactly as above described, the proximal border being exactly at the pyloric vein.

¶ This is one of the rare cases in which the crater of an ulcer retains bismuth. It is the writer's belief that the finding of bismuth in the crater of an ulcer means a dangerously deep ulcer, one near perforation, and that early operation is indicated. In less than a dozen cases, in the writer's experience, has there occurred a bismuth fleck due to imprisonment of bismuth in the ulcer crater in any except ulcers of the lesser curvature, as described by Haudek.

Early Carcinoma of the Pylorus.

[Stereo 32.]

The characteristic roentgen finding in early carcinoma of the pylorus is a filling defect at the site of which the peristaltic waves fail. (See Text Figures 15 and 16). When the lumen of the stomach is encroached upon, as by a neoplastic tumor, there will naturally be a defect in the shadow of the stomach corresponding to the tumor. This is illustrated in Figure No. 20.

Fig. 20.

¶ The pyloric end of the stomach shadow ends in a cone-like projection which is characteristic of carcinoma. Note the filling of the duodenum, which in this case indicates a rapid out-pouring of the stomach contents, in spite of the

Stereo 32. **Serial No 502**

extension of the tumor along the lesser curvature toward the cardia. Adhesions about the pylorus involved not only the pyloric end of the stomach and duodenum, but also the hepatic flexure of the colon. Emptying time of the stomach longer than ten hours.

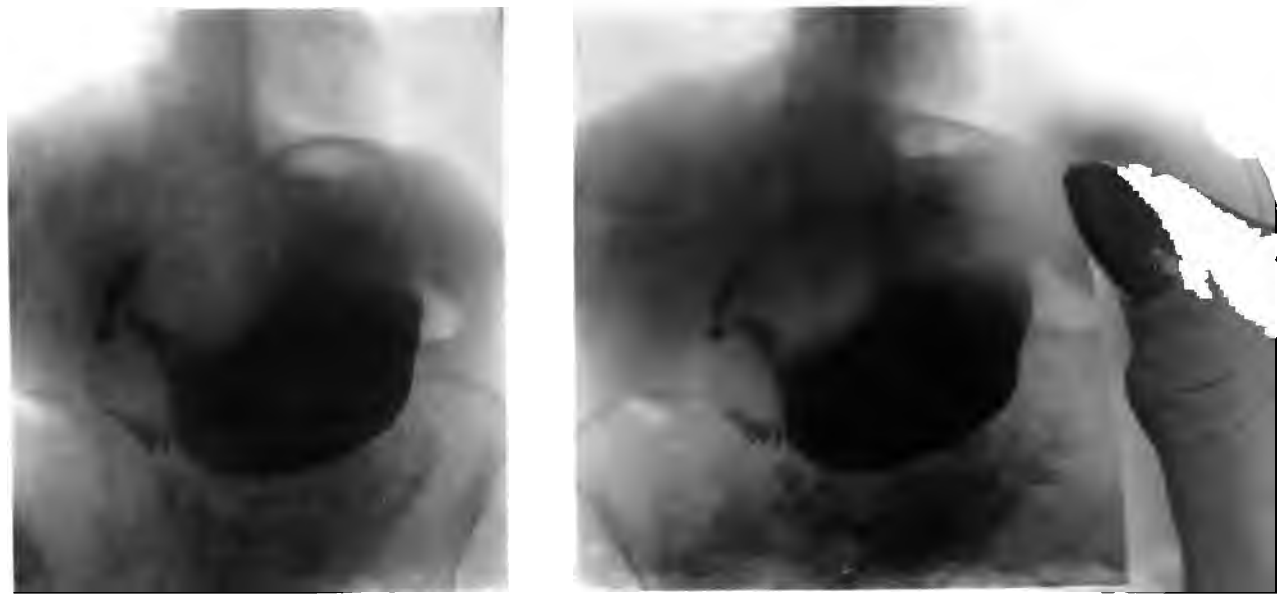
¶ At operation there was found a large, inoperable carcinoma of the pars pylorica; hence a gastroenterostomy was done. The findings in this case are well illustrated in Text Figure No. 20.

Annular Carcinoma of the Pylorus.
[Stereo 33.]

¶ The patient, male, age fifty, a tailor by occupation, had never had any ill health until a year ago, when he began to have pain in the stomach, especially when sitting. The pain began one hour after eating, and continued until the next meal. Two months ago he began regurgitating sour food. Poor appetite. No vomiting. An irregular-shaped mass could be palpated half way between umbilicus and ensiform. It seemed thin and freely movable, descending two inches or more with respiration. The gastric analysis showed no free hydrochloric acid. The stool gave a positive Meyer reaction.

¶ The roentgen examination revealed a deformity in the pyloric end of the stomach, characteristic of annular carcinoma, producing almost complete stenosis. The pylorus was contracted down to the size of a lead pencil. Evident

Stereo 33. **Serial No. 502**



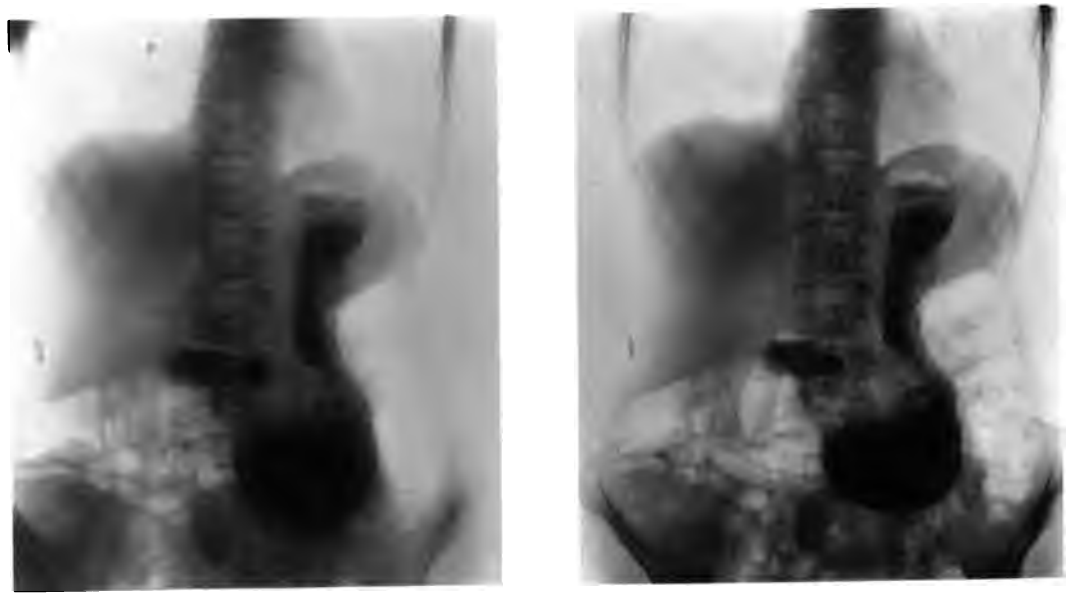
Carcinoma of the Lesser Curvature.

[Stereo 34.]

¶ The patient, female, age fifty-eight, six months ago noticed distension of the bowel with gas, accompanied by a severe, drawing, sharp pain in the abdomen, almost constant, worse at night. The pain was aggravated after bowel movements. No other bowel symptoms. Marked loss in weight. The patient raises a foul-smelling gas from the stomach. Twenty-two years ago she had typhoid fever, accompanied by gastric pains which some of her physicians believed were characteristic of ulcer. Visible peristaltic waves. Marked hypersensitiveness in the epigastric region. Palpable mass in the left side below the costal margin, moving during respiration.

¶ The roentgen examination shows a dilated stomach, the lower border reaching four inches below the navel, patient standing. The greater curvature is very distinct,

Stereo 34. **Serial No 502**



and passing along it the peristaltic waves could be seen very clearly, reaching a point about an inch or an inch and a half from the pylorus. The lesser curvature was very much deformed, and evidently the seat of an extensive filling defect. Antiperistaltic waves very definitely seen. Emptying time of the stomach longer than forty-eight hours. No hindrance in the bowel. The gastric shadow depends somewhat for its clearness upon the state of gas distension of the large bowel, which is very evident in the case.

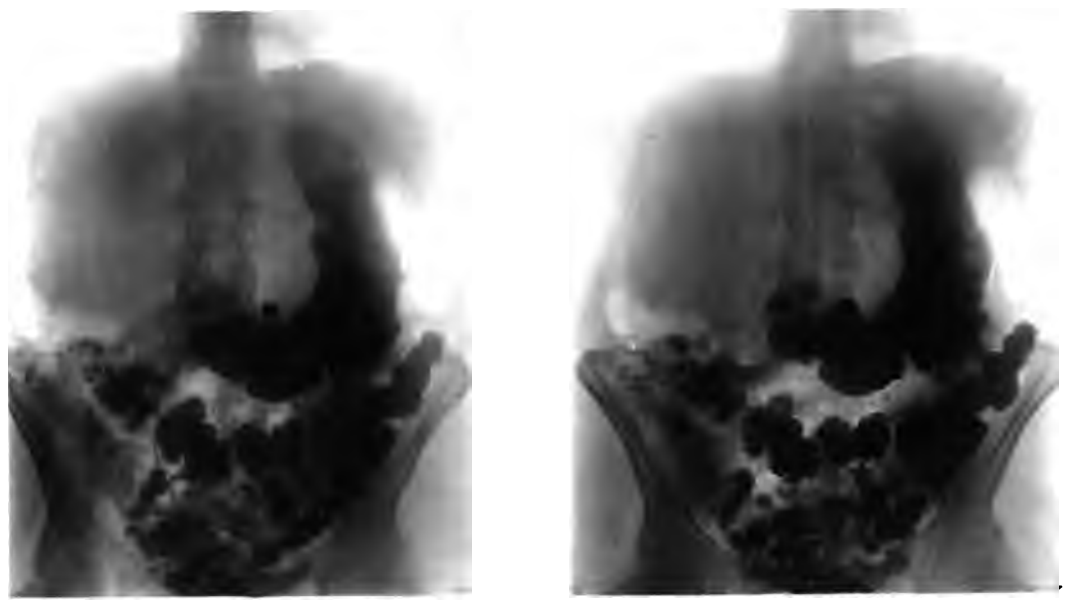
¶ At operation for gastroenterostomy, the X-ray and clinical findings were fully confirmed.

Extensive Scirrhous Carcinoma of the Stomach.
[Stereo 35.]

¶ This case was undiagnosed until after the roentgen findings had been secured. In fact, there was very little in the history or physical examination to suggest carcinoma of the stomach.

¶ During the fluoroscopic studies no peristaltic waves were seen. The stereoroentgenograms showed the entire lesser curvature and almost all the greater curvature involved in a process which in all likelihood was malignant. There was no palpable tumor mass. There was very little in the history or clinical examination to corroborate a diagnosis of carcinoma of the stomach; yet within ten months the patient died from what was proven (post mortem) to be a carcinoma of the stomach.

Stereo 35. **Serial Nº 502**



Carcinoma of the Pars Pylorica.

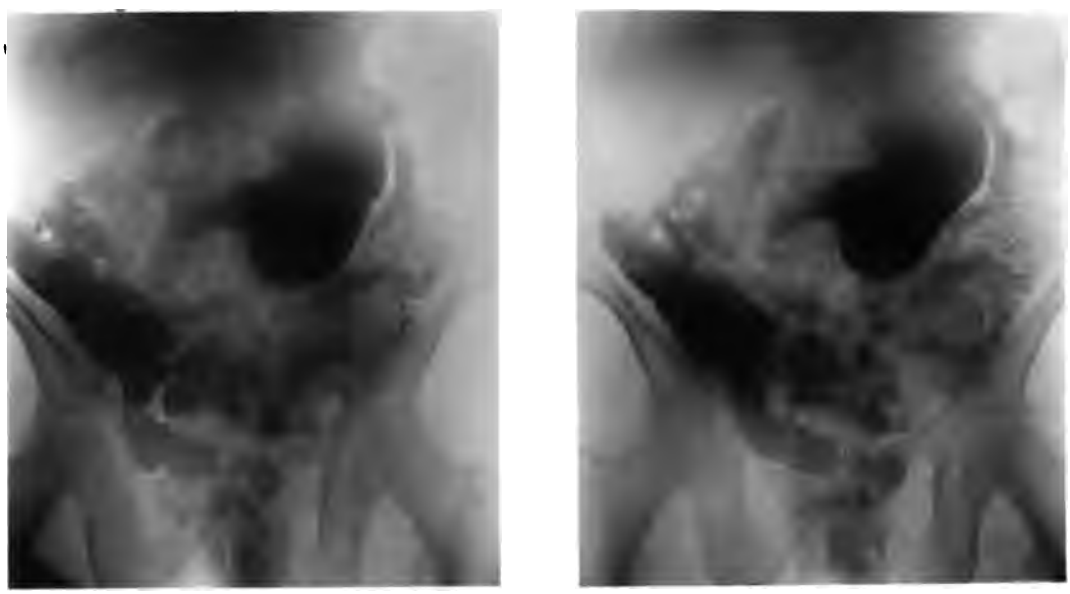
[Stereo 36.]

¶ The roentgenogram was made with the patient prone, plates anterior, almost immediately after the administration of the second bismuth meal, twenty-four hours after the administration of the first.

¶ There are several very interesting features in this case. The pylorus is seen to be deformed, evidently by an extensive tumor mass encroaching upon the stomach shadow in such a manner as to definitely suggest malignancy.

¶ Twenty-four hours after the bismuth meal the head of the bismuth column had not passed the first third of the transverse colon; twenty-four hours later it had made very little progress. The terminal ileum was still widely filled with bismuth at the twenty-fourth hour. Fluoroscopically one was not able by manipulation to separate the bismuth shadows of the cecum and terminal ileum. The fixity of

Stereo 36. **Serial Nº 502**



these shadows, in relation to the palpable tumor mass, points very clearly to a malignancy of the pyloric end of the stomach, involving the transverse colon in the immediate neighborhood. The stomach required sixteen hours for emptying.

¶ At operation the X-ray and clinical findings were confirmed. The stomach was divided at the junction of the middle and distal third with closure of the resulting openings, followed by a long-loop anterior gastrojejunostomy. For relief of the colonic obstruction an ileosigmoidostomy was performed by Kellogg's modification to make an artificial ileocolic valve.

Carcinoma of the Pars Pylorica.

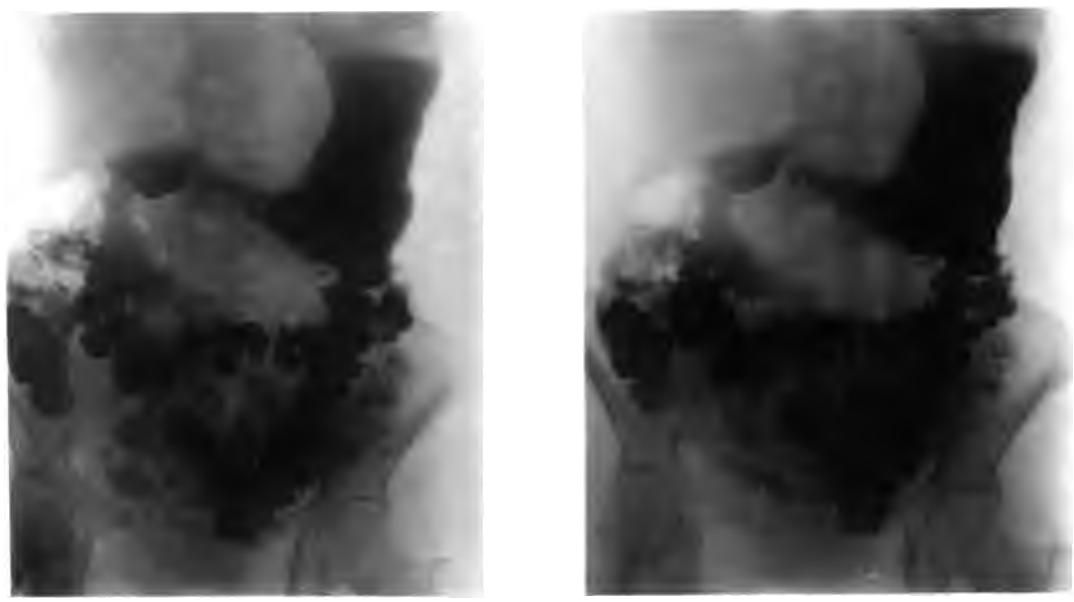
[Stereo 37.]

¶ The patient, female, age sixty-eight, has a clinical history characteristic of a gastric carcinoma. The vomitus is dark in color, though sometimes streaked with bright red blood. No blood or mucus in the stool. Twenty-five pounds loss in weight during the last year.

¶ The X-ray evidences are those of an infiltrating scirrhus, which has completely surrounded the stomach in its lower third and has probably extended up the lesser curvature half way. The stomach emptied very quickly, and most of the bismuth had been evacuated within a few hours, but there was still a residue which persisted at the tenth hour.

¶ An interesting feature of this case is the stasis in the distended duodenum, owing to adhesions about the duodeno-jejunal junction, associated with the malignant process.

Stereo 37. **Serial Nº 502**



Extensive Carcinoma of the Stomach,—Inoperable.
[Stereo 38.]

¶ Patient, age sixty-five, a business man. Twenty-five years ago suffered from what was diagnosed as catarrh of the bile duct. Since then has been troubled with more or less soreness in the stomach, which he has been able to control by the diet. During the last year there has been a loss of fifty pounds in weight, and symptoms characteristic of gastric carcinoma. The motility of the right shoulder joint has considerably decreased, the patient being unable to carry the arm upward without pain in the deltoid region.

¶ The roentgen examination showed an extensive filling defect, involving particularly the greater curvature, but also extending to the lesser curvature. The pylorus is drawn sharply over toward the right. Pyloric insufficiency is evident, the emptying time of the stomach being less than three hours. The apparent extensive fixation and adhesions

Stereo 38. **Serial Nº 502**

¶ The clinical and X-ray findings, which were so evident in this case, were fully confirmed at operation. The particular value of the X-ray in this case was not in the making of the diagnosis, but in furnishing an accurate map of the extent of the disease. It is probable that in the future operation will seldom be performed in cases presenting such clear roentgen evidence of inoperability, unless there is gastrectasis.

¶ This roentgenogram was made with the patient standing, plate anterior. The stomach is filled with the bismuth meal given about ten minutes before the roentgenogram was made. The colon is filled from a meal given the previous day. The lumbar spine shows marked evidence of osteoarthritis, the lipping being especially noticeable in the lumbar vertebræ.

to neighboring parts was further confirmed by manipulation with the protected hand under the fluoroscopic screen. No serious lesion in any other part of the gastro-intestinal tract was discovered by means of the X-ray. Examination of the right shoulder showed a metastatic carcinoma in the upper end of the right humerus.

¶ The findings, as above stated, were confirmed at post mortem.

Cauliflower Carcinoma of Stomach.

[Stereo 39.]

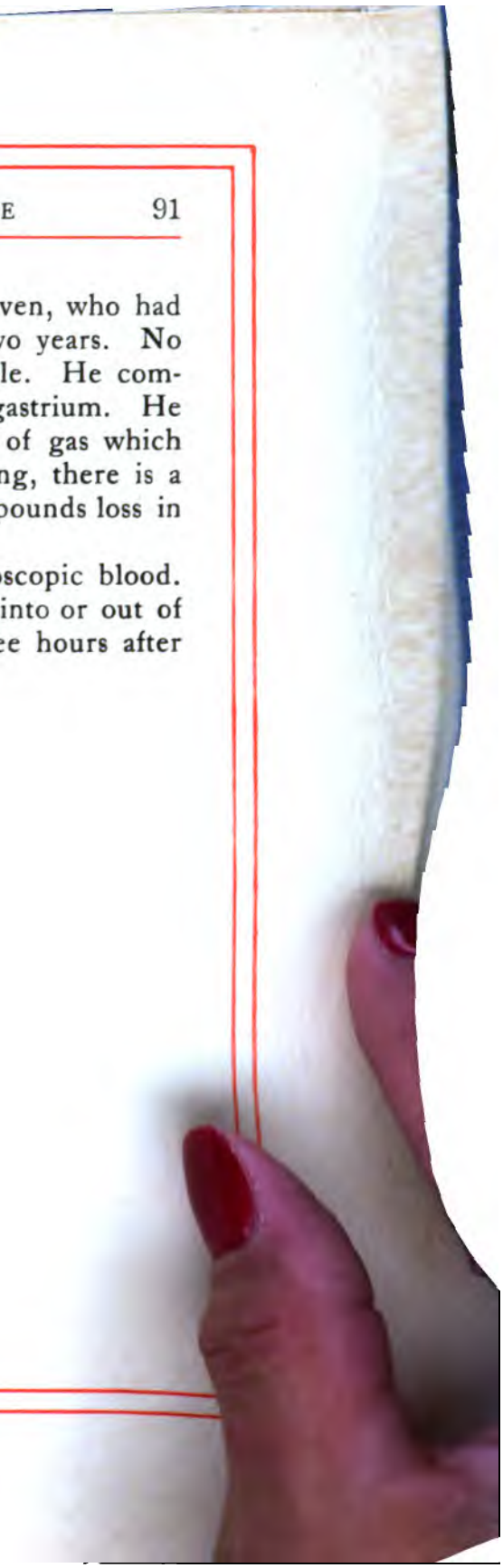
¶ Cauliflower carcinoma of stomach, involving more than half of the greater curvature. Roentgenogram made with patient lying prone, plates anterior, half an hour after the administration of a bismuth-buttermilk meal, which now fills out the stomach and first third of duodenum. The pylorus and the last two inches of the stomach are normal, the changes due to peristalsis blurring the stereoscopic image in this portion of the stomach. The region of the tumor stereoscopes perfectly. The transverse colon is still bismuth-filled from the preceding clysma given during the X-ray study of the colon, which was negative in this case.

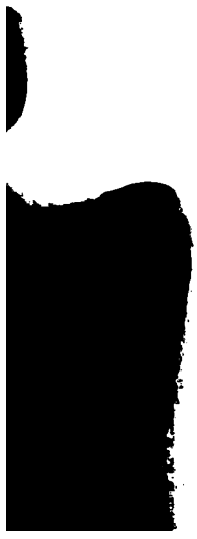
¶ The filling defect in the gastric shadow is characteristic of a cauliflower growth. The serrations of the shadow of the lumen of the stomach extend well up towards the fundus on the greater curvature.

Stereo 39. **Serial Nº 502**

¶ The patient was a laborer, aged thirty-seven, who had complained of stomach trouble for about two years. No history suggestive of previous ulcer obtainable. He complains chiefly of gas, and soreness in the epigastrium. He does not vomit, but he belches a great deal of gas which has a bad odor. Appetite good. After eating, there is a pain in front of the left shoulder. Twenty pounds loss in weight in two years.

¶ Gastric analysis shows achylia and macroscopic blood. No interference with passage of food either into or out of the stomach. Empyting time less than three hours after the bismuth meal.

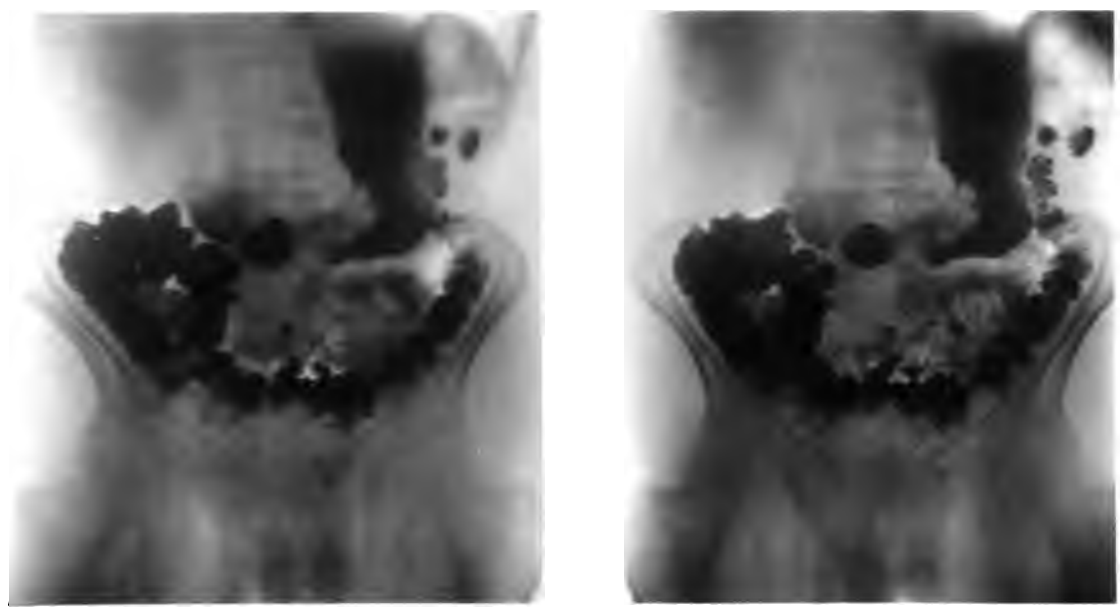




Carcinoma of the Stomach and Descending Colon.
[Stereo 40.]

¶ This case is similar to several of the preceding. The patient, male, age seventy, was never sick in bed in his life, except for two days with an acute infection. Three months ago constipation became a severe symptom; strong cathartics were required regularly to move the bowels; the abdomen became sore, but the patient never vomited. No regurgitation of food; no diarrhea; solid foods caused pain in the stomach; appetite poor. Twenty-five pounds loss in weight during last three months. The physical examination gave negative findings in regard to the stomach. Visible peristalsis was seen in the lower abdomen, the examining physician being unable to decide whether in the transverse colon or in the sigmoid. Abdominal muscles tense, but no mass palpable.

Stereo 40. **Serial No. 502**



¶ The roentgen examination, as illustrated in the accompanying stereo, shows the stomach to be the seat of an extensive infiltrating scirrhous carcinoma, particularly marked on the lesser curvature and posteriorly. There was no pyloric obstruction, the stomach emptying within two and a half hours. This stereo shows the stomach filled by a bismuth meal, given immediately before the plate was made, and the colon filled by bismuth given seventy-two hours before. The head of the bismuth column has not yet passed the middle of the descending colon. During fluoroscopic examination active antiperistalsis alternating with onward peristalsis was seen in the transverse colon.

¶ Injection of the colon by the bismuth enema showed an obstruction of the colon just above the crest of the left ilium.

¶ At operation the stomach was found to be the seat of an extensive carcinoma, with involvement of the last few inches of the transverse colon and the neighboring descending colon. Inasmuch as there was no gastric stasis, no operation was done on the stomach, but an ileosigmoidostomy was performed.

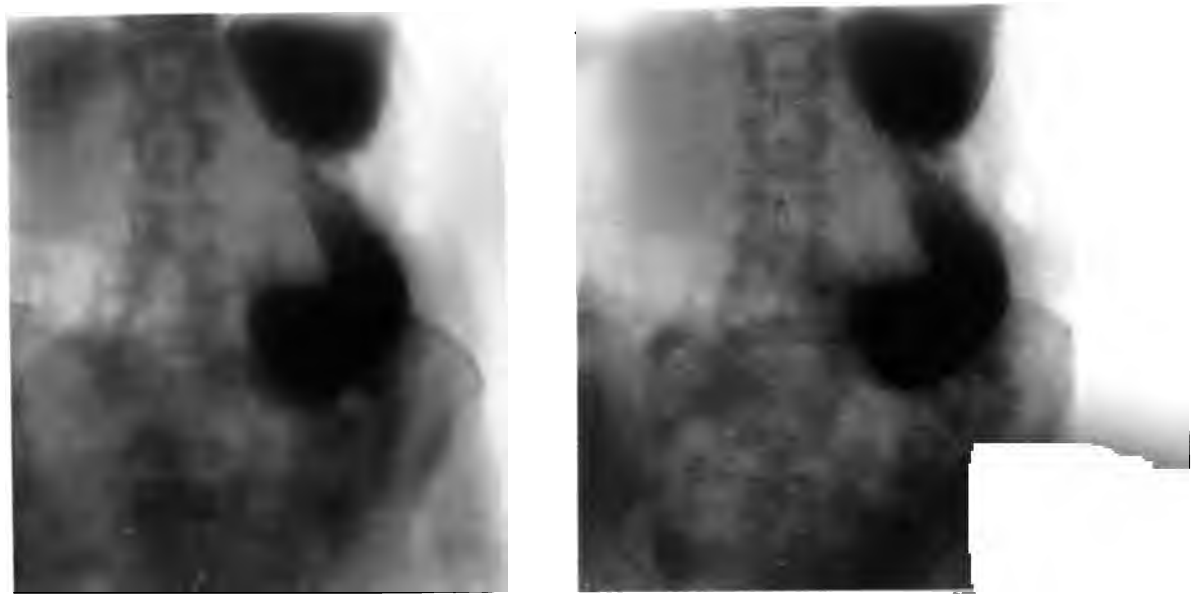
Carcinoma of the Stomach.

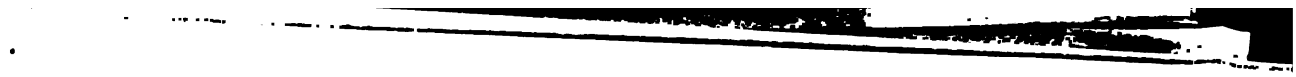
[Stereo 41.]

¶ The patient, female, age sixty-nine, had a typical history of ulcer nineteen years ago. Three years ago she had an operation for pyloric obstruction, at which time the surgeon found an annular carcinoma at the pylorus. A gastroenterostomy was performed. A year later the patient suffered from acute illness, characterized by severe pain in the epigastrium, extending to the right side and between the shoulder blades. Various analgesics were used, and after three or four months, the pain ceased. A year later the patient began to experience bladder symptoms. Cystoscopic examination revealed a tumor mass projecting into the urinary bladder from its anterior wall. This later proved to be a carcinoma.

¶ A bismuth examination, during which the accompanying stereoroentgenogram was made, was ordered to deter-

Stereo 41. **Serial No 502**





mine the state of the stomach three years after gastro-enterostomy for pyloric carcinoma. The pylorus was almost completely closed off; no bismuth at all was seen passing through the pylorus at the time of the examination. Nevertheless, the stomach emptied itself completely within three hours—evidence of normal functioning of the gastro-enterostomy. In addition to the characteristic shape of the pylorus, indicative of pyloric annular carcinoma, there is an hourglass constriction between the upper and middle portions of the stomach, associated with an irregular, digitated filling defect surrounding the stomach, involving both the lesser and the greater curvature.

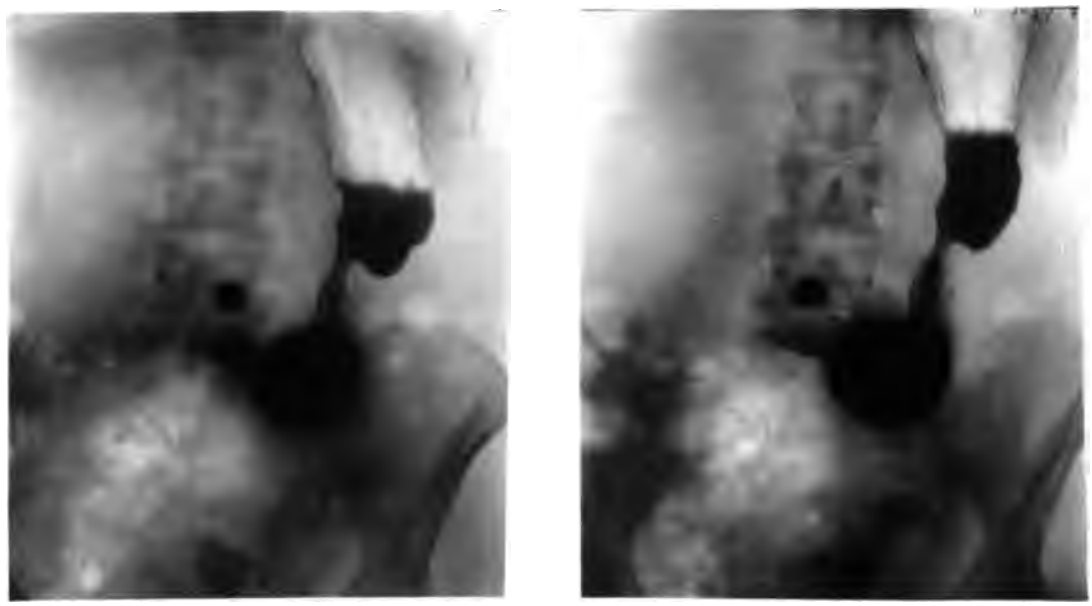
Carcinoma of the Stomach.

[Stereo 42.]

¶ The patient, female, age sixty-two, gives a history of gastric disturbances covering a period of about ten years. Six years ago she suffered from an acute illness, accompanied by pain in the epigastrium and vomiting spells, at one time vomiting a pint of what she called pure blood. Following dietetic and medicinal treatments the gastric symptoms moderated. Two years ago one entire breast was removed for malignant disease. Six months ago the patient began to suffer pain in the thighs, and especially along the right sciatic nerve, much of the pain corresponding to the distribution or the anterior crural nerve. Nine months ago the patient began to suffer from nausea. Later, vomiting has been a symptom, sometimes twice daily.

¶ The roentgen examination showed a typical hour-glass stomach, as shown in the accompanying stereo. The

Stereo 42. **Serial No 502**



patient did not hold the breath satisfactorily, hence the upper half of the stomach did not remain still throughout the two exposures. The lower half of the stomach stereoscopes perfectly. The form of the hourglass constriction in this case suggests ulcer as well as carcinoma. Roentgen examination of the pelvis to ascertain the cause of the patient's pain in that region revealed metastatic involvement of the right ischium.

¶ The ordinary hourglass constriction of the stomach, due to carcinoma, makes an annular constriction involving both the lesser and the greater curvature, as shown in

Fig. 21

the accompanying Figure No. 21, which illustrates the tumor mass projecting into the shadow of the stomach, giving the typical appearance of a malignant hourglass constriction. It will be observed that there is a considerable infiltration of the stomach wall with comparatively little shrinkage. The isthmus connecting the upper and the lower sacs frequently lies near the greater curvature and

nearly always lies in the middle portion of the stomach, (as illustrated in Stereo 41); whereas, in callous ulcer of the stomach with hourglass formation the constriction is transverse and circumscribes the isthmus between the upper and the lower sacs, being near the lesser curvature. The isthmus is occasionally found on the anterior or posterior surface of the stomach, near the lesser curvature, but rarely in the middle of the stomach and never on the greater curvature. On palpation, with the protected hand under the fluorescent screen, one finds in carcinoma of the stomach with hourglass formation that there is a nodular resistance on both sides of the isthmus, whereas, in hourglass stomach with ulcer the greater curvature is quite smooth and the resistance is felt to the right of the isthmus. The characteristic outline of the hourglass stomach associated with callous ulcer is shown in Figure No. 19.

¶ Another evidence of the organic nature of the constriction in this case is the presence of peristaltic waves in the upper sac. Considering the patient's history it is probable that there was originally a penetrating ulcer of the lesser curvature, which later underwent malignant degeneration.

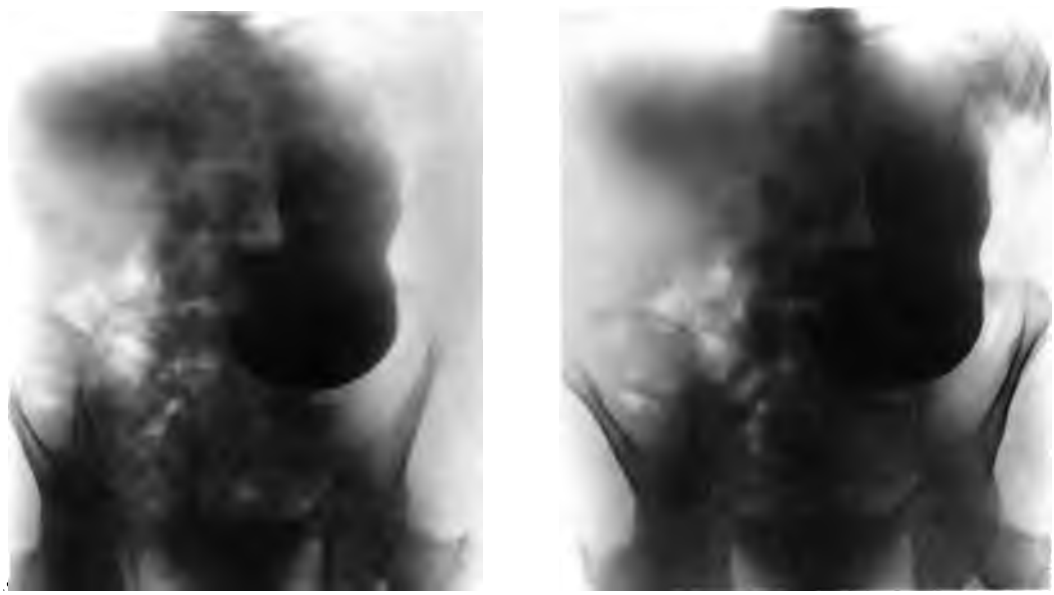
Carcinoma of the Stomach.

[Stereo 43.]

¶ This patient's history was quite negative until five months ago, at which time he began to experience pain in the stomach an hour or two after eating. The pain the patient characterized as dull, although at times it became cramping. The color and form of the stool changed; the bowel movements began to appear black and waxy-looking. Ten days ago the patient first observed a tumor in the epigastrium corresponding with a point of moderate tenderness on pressure. The patient is never nauseated and never vomits. He eats regularly and enjoys his food. Sometimes pressure over the abdomen relieves the pain.

¶ There is an evident epigastric tumor, hard and slightly nodular, which moves up and down with respiration, and corresponds with a point of considerable tenderness when accurate pressure is applied.

Stereo 43. **Serial No 502**



¶ The roentgen examination shows a carcinomatous involvement of the pylorus, the pylorus being almost completely shut off. There was still some of the bismuth meal in the stomach at the twenty-eighth hour. Peristaltic waves were absent in the lower third of the stomach. No antiperistaltic waves were observed during several seances.

¶ The roentgen findings in this case, while certainly not needed to make the diagnosis, are surely of value in presenting a map of the exact situation. The extent of the tumor is definitely learned, and considerable light is thrown upon the emptying time of the stomach, which, from the history, would not be expected to exceed the normal. Following a very thorough examination, there was no X-ray evidence that any other portion of the gastrointestinal tract was involved. The opinion was then expressed that the tumor was inoperable, but that palliative gastroenterostomy was indicated.

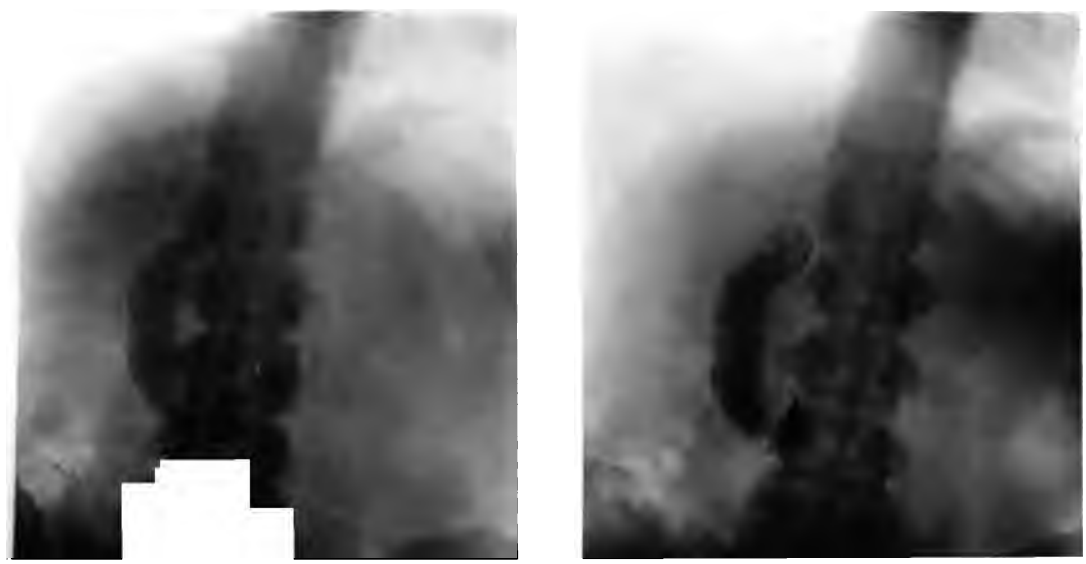
Cholelithiasis.

[Stereo 44.]

¶ It is the general impression among physicians, as well as laymen, that it is scarcely worth while to submit a patient to a roentgen examination for gallstones. This belief is founded upon the fact that the principal constituent of gallstones is cholesterin, and that many gallstones consist entirely of pure cholesterin. The comparative infrequency with which gallstones have been discovered in many thousand routine examinations of the urinary tract, as compared with the estimated frequency of gallstones based upon post-mortem statistics, has further served to discourage roentgenographic search for them.

¶ Recent investigations, however, have shown that **pure** cholesterin gallstones are rare. The cholesterin stones nearly always contain some pigment, most likely a calcium salt. The opinion that gallstones were beyond the ken of

Stereo 44. **Serial No. 502**



the roentgen examination was expressed twelve or fourteen years ago when roentgenographic technic was in its infancy. The improvements of the last few years, however, have opened up new fields of possibility, especially with reference to soft tissue detail.

¶ I believe I am safe in the opinion that when gallstones are present they may be demonstrated on the roentgenogram in forty or fifty per cent. of cases. In this, both Cole and Pfahler agree. A negative opinion as to the presence of gallstones, following the roentgen examination, does not rule them out, of course; but, in my experience, gallstones have been demonstrated with such great frequency (five per cent. of cases undergoing bismuth meal examination) that it is distinctly worth while to search for them in every suspected case. One of the chief reasons for the more frequent discovery of gallstones during roentgen examination has been the fact that it has been considered distinctly worth while to look for them. All roentgenograms of the hepatic region are most carefully scrutinized for any suspicious shadows.

¶ Various confusing shadows likely to be found in the right upper quadrant are a source of error in the diagnosis of gallstones; i.e., calcareous deposits in the costal cartilages, renal calculi, calcareous deposits in a tuberculous kidney, and calcified mesenteric lymphnodes. Bismuth residues are sometimes confusing in differentiating right upper quadrant shadows.

¶ Many gallstone shadows have characteristic markings which serve to identify them. The stratified arrangement of calcareous deposits give a capsule-like appearance to certain gallstone shadows; many stones show facets, others

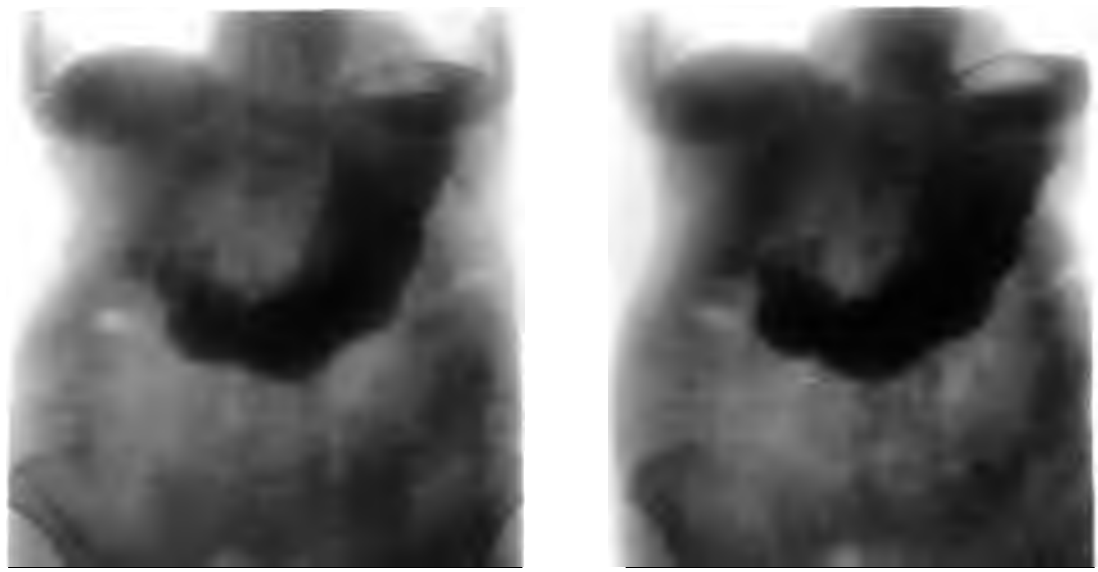
Cholelithiasis, With Pericholecystic Adhesions.

[Stereo 45.]

¶ In this case two gall stones are very nicely seen. The stomach is hypertonic and occupies an unusually marked transverse position, seen even with the patient standing, suggesting that there are adhesions which draw the pylorus upward and toward the right. Special attention has been called to this sign by Pfahler. The forward rotation of the stomach shown in Stereo 17 is also seen here. The hypertonicity, the forward rotation, the evidence of hepatofixation, and the alteration in the emptying time of the stomach would all contribute to the diagnosis of a gall bladder lesion with adhesions, even if the stones were not sufficiently dense to cast a shadow. The presence of the gall stone shadows makes the situation very evident.

¶ Even if no suspicious shadows are present, there are a number of roentgen findings which assist in the diagnosis

Stereo 45. **Serial N° 502**



of gall bladder disease with or without stone. These finding are best brought out during a bismuth meal study, and may be enumerated as follows:

¶ 1. Hepatofixation of the stomach, the pyloric region being drawn to the right and upward in a significant manner, as above described. These adhesions rarely interfere with the emptying time of the stomach.

¶ 2. The emptying time of the stomach following a bismuth meal is often much shortened, especially when there are adhesions involving the gall bladder and the first portion of the duodenum. On the other hand, there are numerous cases of delayed emptying associated with deformity of the shadow of the first portion of the duodenum, and a spastic indrawing on the greater curvature, high up near the cardia. At other times there may be a complete spasm of the pars pylorica, with associated delay in the emptying time of the stomach.

¶ 3. A definitely tender point of pain on pressure, accurately localized to a point to the outside of the duodenal shadow.

¶ 4. Riedel's lobe may sometimes be demonstrated, following gas distension of the stomach and colon. This sign is particularly valuable in cases of suspected gall bladder disease in which jaundice is not a symptom.

Cholelithiasis; Carcinoma of the Stomach.

[Stereo 46.]

¶ The diagnosis was entered as a carcinoma of the stomach, for which gastroenterostomy was proposed. The roentgen examination revealed such complete involvement of the gastric wall that there was not sufficient room for a gastroenterostomy, and this opinion was expressed. It was found that the pyloric end of the stomach was adherent in the gall bladder region, where six gallstones were very distinctly seen. The outline of the upper surface of the liver is seen to be very irregular. Based upon this, an opinion was ventured that the liver would be found to be the seat of extensive secondary involvement. There is almost complete pyloric stenosis, most of the bismuth meal remaining in the stomach at the end of twenty-four hours. The colon and small intestines were found to be free from obstruction.

Stereo 46. **Serial Nº 502**

¶ At operation the gallstones were distinctly palpated, but on account of the patient's condition, they were not removed. The gastric walls were so extensively involved that a jejunostomy was performed. No disease could be discovered in the small intestine, or in the colon. The liver was seen to be involved, being studded with carcinomatous nodules.

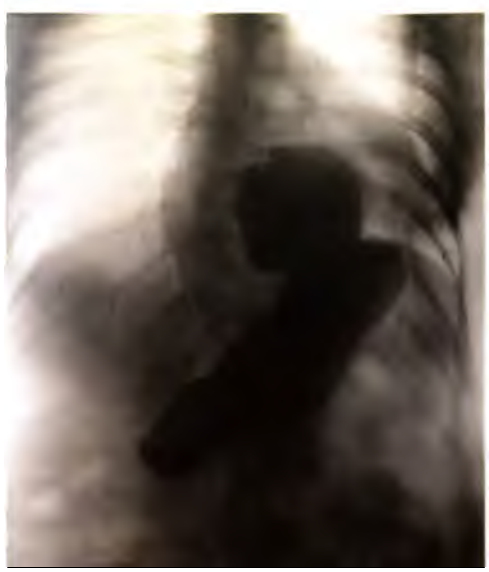
Diaphragmatic Hernia.

[Stereo 47.]

¶ The patient, female, age forty-three, exhibits a marked curvature of the spine toward the right, the curvature being especially marked in the mid-dorsal region. A year ago the patient's symptoms were such as to lead the surgeon to do an operation on the gall bladder. No stones were found, and simple drainage was done.

¶ For two years the patient has been anemic, although she is well nourished. A year and a half ago she went to bed because of anemia and nervousness, which was very much relieved by a long course of rest cure. The patient has for a long time suffered from nausea without vomiting, the nausea being accompanied by severe headaches. Aside from the nausea, the patient has no gastric symptoms. An X-ray examination was recommended to find, if possible, the cause of the anemia, intestinal stasis being suspected.

Stereo 47. **Serial № 502**



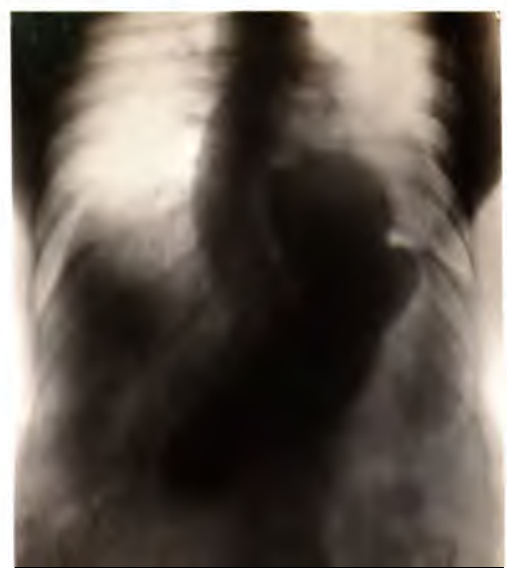
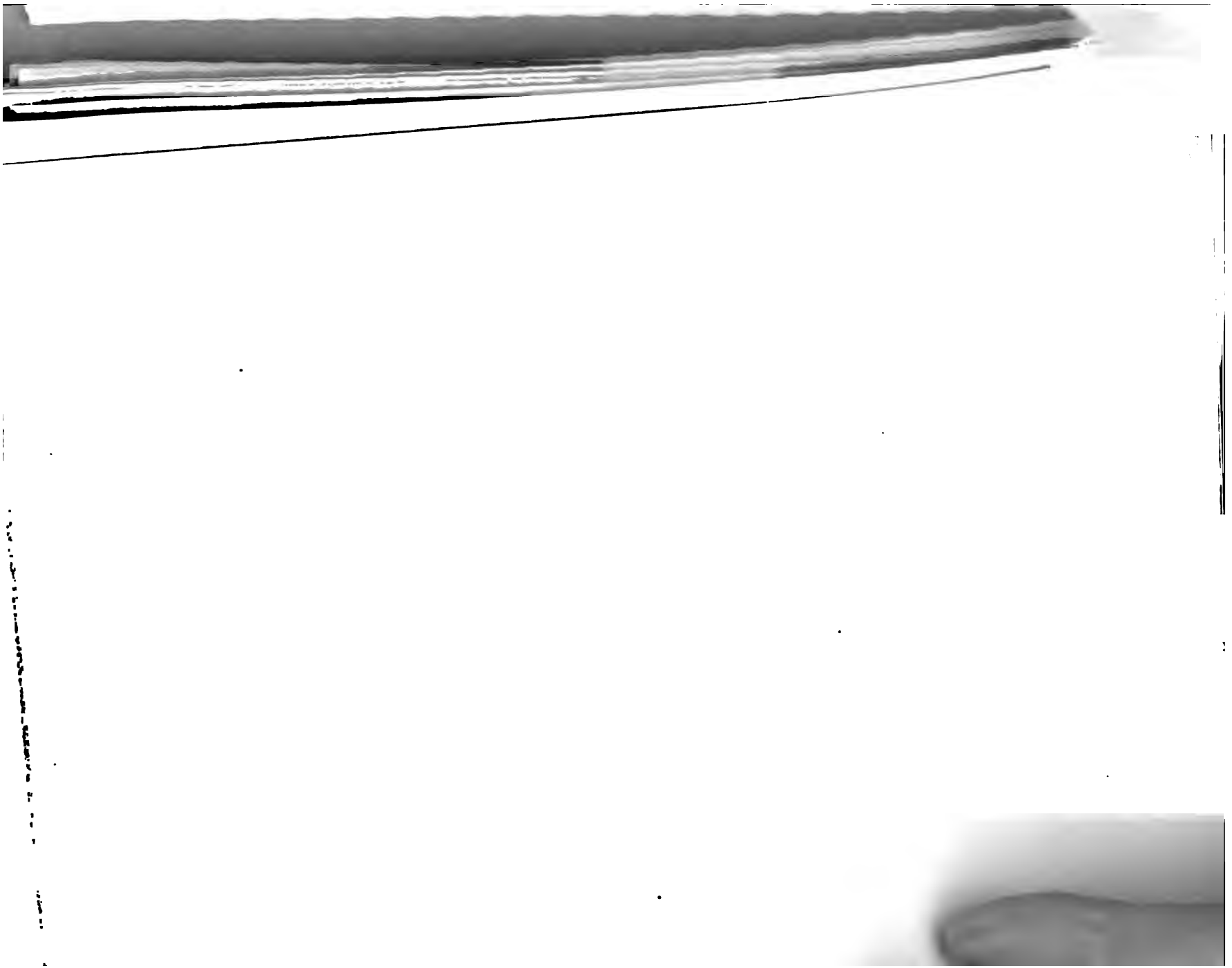


Fig. 22

¶ During the course of the examination, the diaphragmatic hernia was accidentally discovered. The accompanying stereoroentgenogram was made with the patient supine, plates posterior. When the patient was standing the protrusion of the stomach through the hernial opening in the diaphragm was not easily apparent on account of the deformity of the spine, but with the patient lying the deformity is easily observed.

¶ During the last two years the writer has found three cases of diaphragmatic hernia. In all three there was a spinal deformity of considerable grade. In none of the cases were the gastric symptoms marked.



Subphrenic Abscess.

[Stereo 48.]

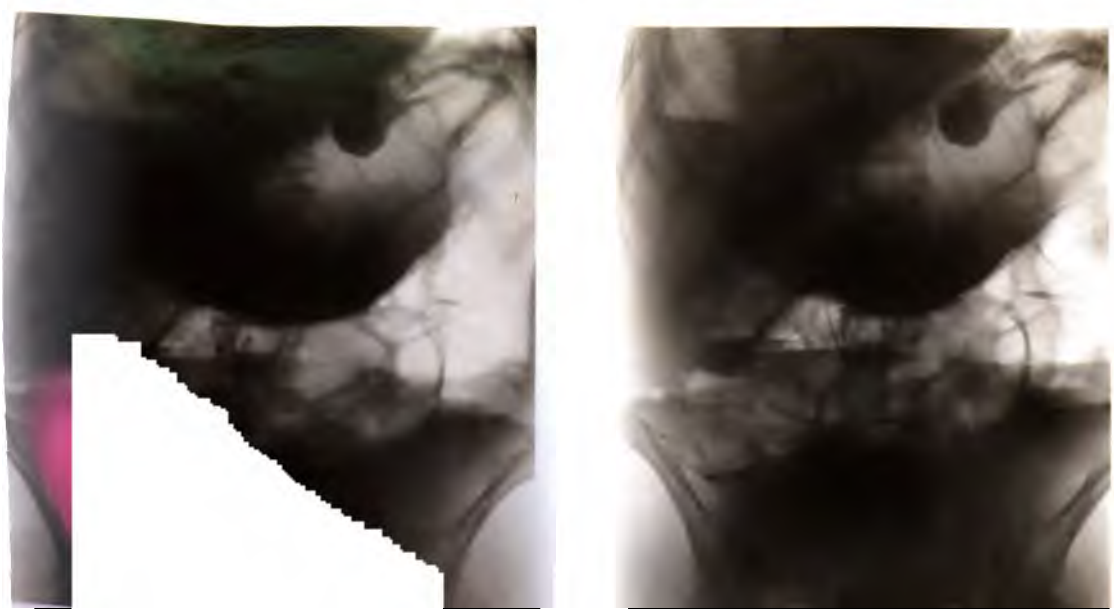
¶ The patient, a young man, age thirty-two, gave a very definite history of a perforating gastric ulcer, with symptoms pointing to acute small intestine obstruction. The patient's symptoms were such as to demand immediate operation. A bismuth examination was started, but was not completed on account of the urgency of the symptoms.

¶ The stereoroentgenogram, made with the patient erect, shortly after the ingestion of a bismuth meal, shows the following:

¶ 1. Marked dilatation of the stomach. During the fluoroscopic examination, the peristaltic waves were seen to be unusually deep and unusually active, further evidence of gastric stasis.

¶ 2. The small intestine was distended with gas. The patient had been examined a week previously and the same

Stereo 48. **Serial No. 502**



gas distension of the small intestine had been noted. Fluoroscopic observation showed changes in the level of the fluid in the various coils of the small intestine, associated with antiperistalsis alternating with onward peristalsis. These are signs of a small intestine obstruction.

¶ 3. Within the liver shadow there is a gas collection above a fluid level, shown at the arrows in Figure No. 23.

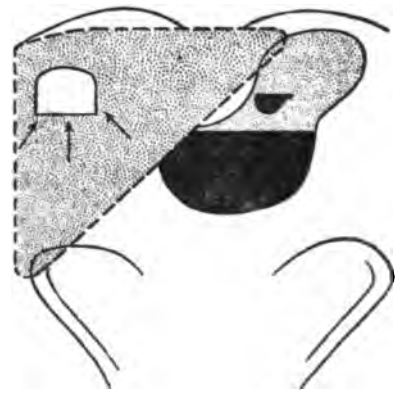


Fig. 23.

The level of the fluid is seen to change when the patient alters his position, the level of the fluid always remaining horizontal. When the patient is shaken, the level of the fluid can be seen (fluoroscopically) to show ripples upon its surface.

¶ The X-ray findings were sufficient to support a diagnosis of acute small-intestinal obstruction (the obstruction occuring somewhere near the middle of the small intestine), and of subphrenic abscess, probably due to the perforated gastric ulcer.

¶ At operation there were found adhesions between the stomach and spleen and along the entire lesser curvature. The small intestine was enormously distended, having a diameter of four inches. The obstruction, which was four inches above the ileocecal valve, was due to an adhesion band running from a point two inches below the umbilicus to the right face of the mesentery of the ileum. After relief of this band, the small intestine was easily emptied of gas. The subphrenic abscess was found and drained. Fortunately the great omentum was adherent to the anterior abdominal wall from the midline to the right side of the hepatic flexure, completely shutting off the subphrenic abscess from the abdomen.

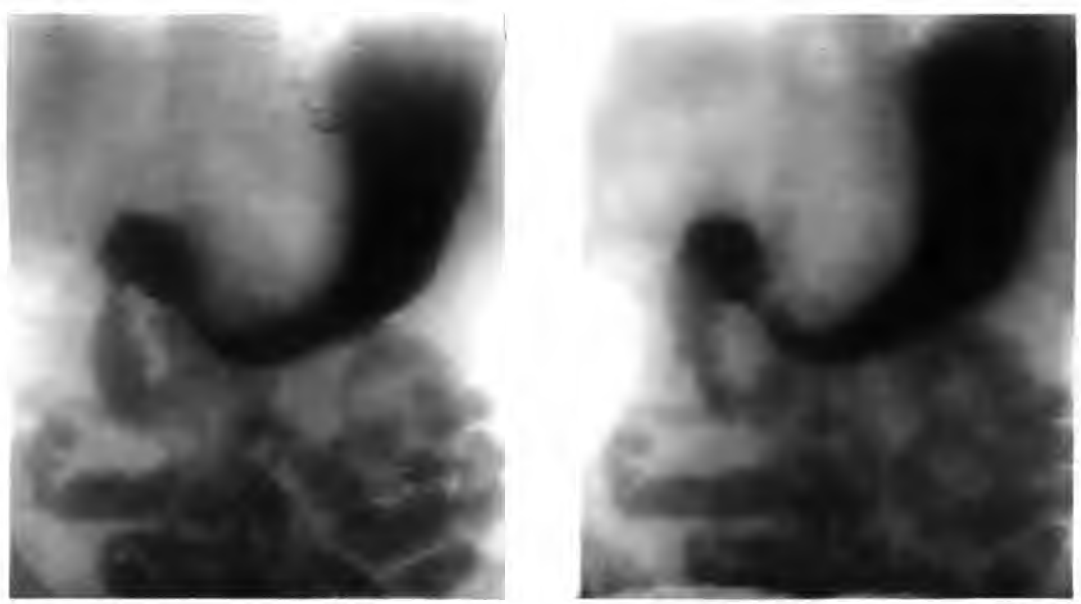
Carcinoma of the Pancreas.

[Stereo 49.]

¶ This case illustrates the value of the roentgen examination in the identification of abdominal tumors. The patient, male, age fifty, gives a history of gastric disturbance dating back four months. First he had pain on both sides of the epigastrium attended by nausea, but without vomiting. These pains occurred periodically at intervals of about one month, each attack lasting two or three days. The attacks became more frequent and the pain more obstinate. The pains now begin two hours after eating and last two or three hours, but are not affected by eating. The pain is worse with the patient recumbent, but is relieved when walking.

¶ Physical examination revealed a tumor mass in the epigastric and hypogastric region which seemed to move slightly on inspiration. There was marked tenderness over

Stereo 49. **Serial № 502**



it. The area of dullness was continuous with the liver dullness on the right side, but not continuous with the liver or splenic dullness on the left side. The dullness seemed to be circular in form, measuring three inches transversely. The gastric analysis was negative. On account of an evident transmitted pulsation the possibility of an aneurism of the abdominal aorta was strongly considered.

¶ The roentgen examination revealed an extraventricular tumor mass, pressing upon the stomach, distorting the lesser curvature. The pylorus was insufficient, the stomach emptying very rapidly. This was considered an evidence of pancreatic involvement, as the stomach usually empties very quickly whenever the pancreas is involved.

¶ The opinion was expressed that the tumor was extraventricular and retroperitoneal, either a pancreatic tumor or a retroperitoneal sarcoma.

¶ At operation there was found a carcinoma involving the entire pancreas, but particularly the body and the tail of the pancreas, pushing the stomach forward.

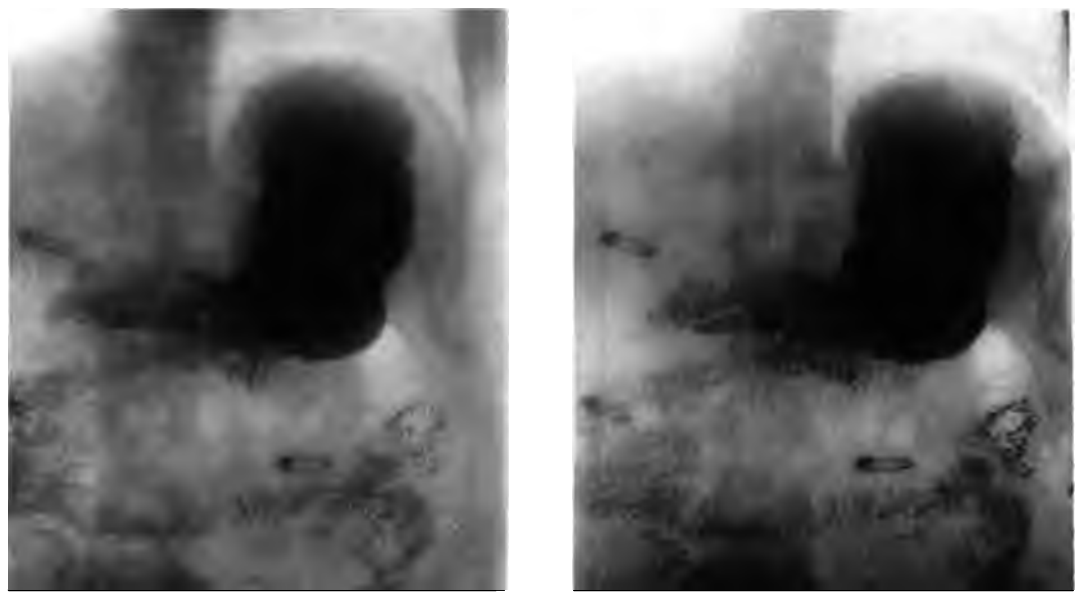
Gastroenterostomized Stomach.

[Stereo 50.]

¶ This examination was made three weeks after a gastroenterostomy for pyloric stenosis. The roentgenogram shows that the opening was made at the lowest point of the stomach, and within a short distance of the pylorus. Most of the food is passing through the gastroenterostomy opening. The pins are in an abdominal bandage which the patient was still wearing as a sort of abdominal supporter.

¶ Post-operative roentgen studies are always interesting and frequently very valuable. This is particularly true of cases in which the operation of gastroenterostomy has been performed. The X-ray examination, particularly when done fluoroscopically and checked by stereoroentgenograms, may show the following:

Stereo 50. **Serial No. 502**



¶ 1. The exact position of the gastroenterostomy opening with relation to the pylorus and the lower border of the stomach.

¶ 2. The proportion of material passing through the gastroenterostomy opening and through the pylorus.

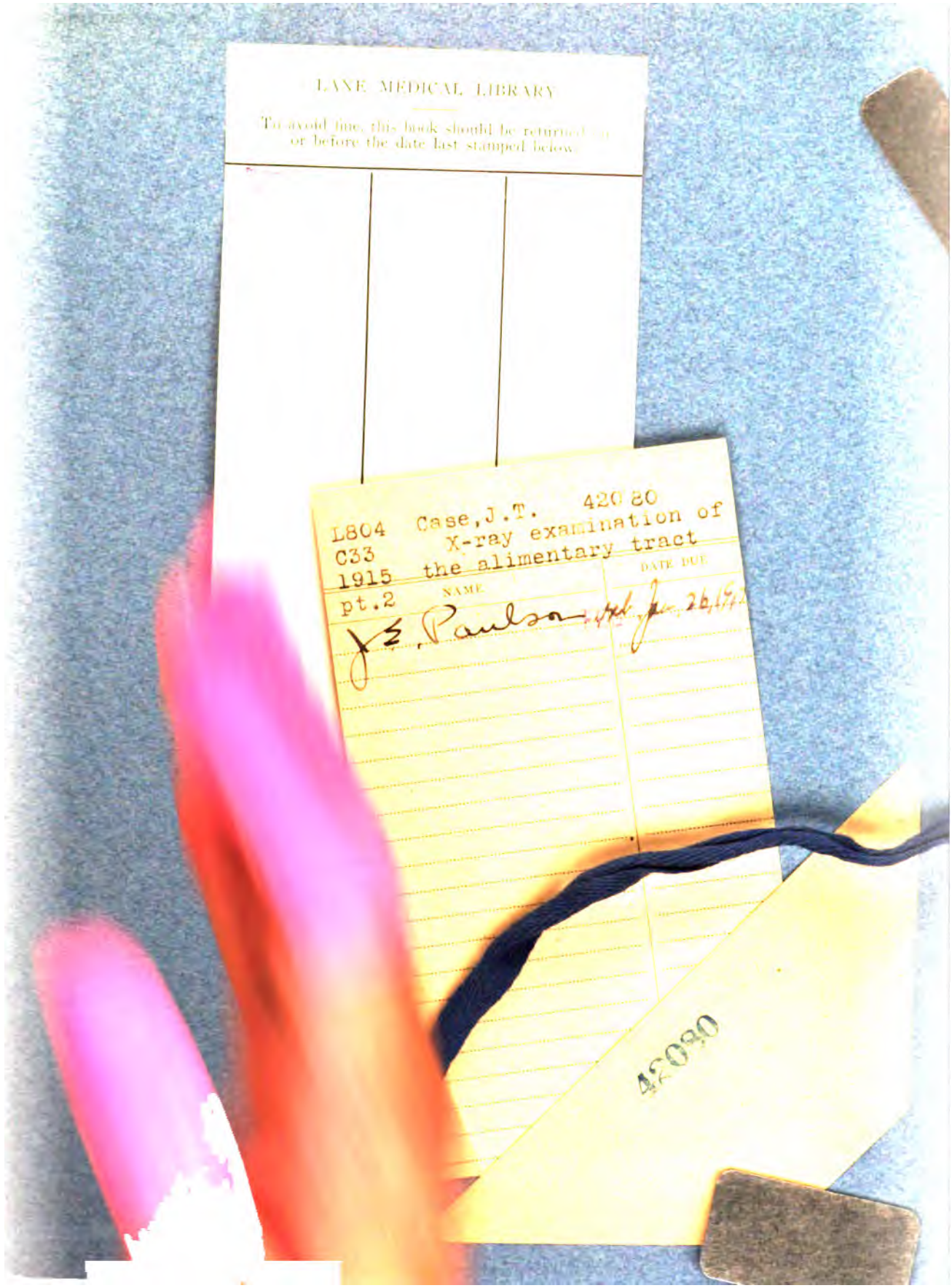
¶ 3. Sometimes vicious circles are demonstrable.

¶ The X-ray has been particularly valuable in throwing light upon the functioning of the stomach after gastroenterostomy. I have been particularly impressed with the persistency with which the stomach will endeavor to pass the food out of the pylorus rather than through the new opening.

¶ Cannon found that after a pyloroplasty according to Finney's method, there was developed, in the duodenum, a tonic constriction ring several inches below the pylorus. This tonic constriction ring relaxed periodically, serving to pass the food at certain intervals into the small intestine, in a way taking the place of the old pylorus.

¶ I have observed a similar finding in the jejunum about two inches below the gastroenterostomy opening, viz.: a tonic constriction ring which opened periodically, thus taking on somewhat the function of the pylorus. The presence of this tonic constriction ring is not often seen in old cases, but when the patients are examined within three or four weeks after the operation, the tonic constriction ring is often seen.

¶ Gastrojejunal ulcers are occasionally made out, and, in one case, I diagnosed a gastrojejunal ulcer, with adhesions of the transverse colon: The patient later developed a gastrocolic fistula. Post-mortem proof.


LANE MEDICAL LIBRARY
To avoid fine, this book should be returned on or before the date last stamped below
L804 C33 1915 pt.2
Case, J.T. 420 80
X-ray examination of the alimentary tract
NAME
DATE DUE
J. S. Paulson
42090